Claims

What is claimed is:

1. A speech coder for compressing a speech signal, the speech coder comprising:

means for receiving a predictor coefficient as input;

means for storing the predictor coefficient in a first temporary storage buffer;

means for determining a reflection coefficient from the predictor coefficient stored in the first temporary storage buffer;

means for calculating a multiplication factor;

means for recursively calculating a numerator and multiplying the numerator by the multiplication factor; and

means for stopping the recursive calculation after it has been performed a predetermined number of times,

wherein the multiplication factor is determined outside the recursive calculation.

2. The speech coder of claim 1, wherein the means for calculating the numerator is defined by the equation:

temp = (b1[j] – k[i] * b1[i-j]),

wherein

i is an integer value;

j is an integer value;

temp is a second temporary storage buffer, for storing the numerator;

b1[j] is a third temporary storage buffer, for storing values of the first temporary storage buffer; and

b1[i-j] is a fourth temporary storage buffer, for storing values of the first temporary storage buffer.

3. The speech coder of claim 1, wherein the means for determining the reflection coefficient includes amplification of the predictor coefficient stored in the first temporary storage buffer.

4. The speech coder of claim 1, wherein the means for calculating the multiplication factor includes means for determining a denominator.

5. The speech coder of claim 4, further comprising means for amplifying said denominator to its largest and most accurate value.

6. The speech coder of claim 5, further comprising means for performing a fixed-point division operation using the denominator.

7. The speech coder of claim 6, wherein the means for performing the fixed-point division operation includes means for taking an inverse of the denominator.

8. The speech coder of claim 7, wherein the means for taking the inverse of the denominator is defined by the equation:

Divd = 0x4000 / n_e,

wherein

Divd is the multiplication factor;

0x4000 is a hexadecimal representation of 0.5; and

n_e is the denominator, which represents a normalized and amplified value of a residue of the signal.

9. The speech coder of claim 8, further comprising means for amplifying the multiplied numerator and multiplication factor.

10. A method of speech coding for compression of a speech signal, the method comprising:

receiving a predictor coefficient as input;

storing the predictor coefficient in a first temporary storage buffer;

determining a reflection coefficient from the predictor coefficient stored in the first temporary storage buffer;

calculating a multiplication factor;

recursively calculating a numerator and multiplying the numerator by the multiplication factor; and

stopping the recursive calculation after it has been performed a predetermined number of times,

wherein the multiplication factor is determined outside the recursive calculation.

11. The method of claim 10, wherein the step of calculating the numerator includes solving the equation:

temp = (b1[j] – k[i] * b1[i-j]),

wherein

i is an integer value;

j is an integer value;

temp is the second temporary storage buffer, for storing the numerator;

b1[j] is a third temporary storage buffer, for storing values of the first temporary storage buffer; and

b1[i-j] is a fourth temporary storage buffer, for storing values of the first temporary storage buffer.

12. The method of claim 10, wherein the step of determining the reflection coefficient includes amplifying the predictor coefficient stored in the first temporary storage buffer.

13. The method of claim 10, wherein the step of calculating the multiplication factor includes determining a denominator.

14. The method of claim 13, further comprising amplifying said denominator to its largest and most accurate value.

15. The method of claim 14, further comprising performing a fixed-point division operation using the denominator.

16. The method of claim 15, wherein the step of performing the fixed-point division operation includes taking an inverse of the denominator.

17. The method of claim 16, wherein the step of taking the inverse of the denominator includes solving the equation:

Divd = 0x4000 / n_e,

wherein

Divd is the multiplication factor;

0x4000 is a hexadecimal representation of 0.5; and

n_e is the denominator, which represents a normalized and amplified value of a residue of the signal.

18. The method of claim 17, further comprising amplifying the multiplied numerator and multiplication factor.

19. A method of speech coding for compression of a speech signal, the method comprising:

receiving a predictor coefficient as input;

storing the predictor coefficient in a first temporary storage buffer;

determining a reflection coefficient from the predictor coefficient stored in the first temporary storage buffer;

calculating a multiplication factor from a denominator, wherein the multiplication factor is defined by the equation:

Divd = 0x4000/n_e,

wherein

Divd is the multiplication factor;

0x4000 is a hexadecimal representation of 0.5; and

n_e is the denominator, which represents a normalized and amplified value of a residue of the signal;

recursively calculating a numerator and multiplying the numerator by the multiplication factor, wherein the numerator is defined by the equation:

$$temp = (b1[j] - k[i] * b1[i-j]),$$

wherein

i is an integer value;

j is an integer value;

temp is the second temporary storage buffer, for storing the numerator;

b1[j] is a third temporary storage buffer, for storing values of the first temporary storage buffer; and

b1[i-j] is a fourth temporary storage buffer, for storing values of the first temporary storage buffer; and

stopping the recursive calculation after it has been performed a predetermined number of times,

wherein the multiplciation factor is determined outside the recursive calculation.

20. The method of claim 19, wherein the step of determining the reflection coefficient includes amplifying the predictor coefficient stored in the first temporary storage buffer.

21. The method of claim 20, further comprising amplifying the multiplied numerator and multiplication factor.

22. A speech coder for compressing a speech signal, the speech coder comprising:

a predictor coefficient received as input;

a first temporary storage buffer, wherein the first temporary storage buffer stores the predictor coefficient;

a reflection coefficient determined from the predictor coefficient stored in the first temporary storage buffer;

a multiplication factor; and

a numerator,

wherein the numerator is recursively calculated and multiplied by the multiplication factor, the recursive calculation is stopped after it has been performed a predetermined number of times, and the multiplication factor is determined outside the recursive calculation.

23. The speech coder of claim 22, wherein the numerator is defined by the equation:

temp = (b1[j] – k[i] * b1[i-j]),

wherein

i is an integer value;

j is an integer value;

temp is a second temporary storage buffer, for storing the numerator;

b1[j] is a third temporary storage buffer, for storing values of the first temporary storage buffer; and

b1[i-j] is a fourth temporary storage buffer, for storing values of the first temporary storage buffer.

24. The speech coder of claim 22, wherein the reflection coefficient is determined by amplification of the predictor coefficient stored in the first temporary storage buffer.

25. The speech coder of claim 22, wherein the multiplication factor includes a denominator.

26. The speech coder of claim 25, wherein the denominator is amplified to its largest and most accurate value.

27. The speech coder of claim 26, wherein the denominator is used to perform a fixed-point division operation.

28. The speech coder of claim 27, wherein the fixed-point division operation includes taking an inverse of the denominator.

29. The speech coder of claim 28, wherein the inverse of the denominator is defined by the equation:

Divd = 0x4000 / n_e,

wherein

Divd is the multiplication factor;

0x4000 is a hexadecimal representation of 0.5; and

n_e is the denominator, which represents a normalized and amplified value of a residue of the signal.

30. The speech coder of claim 29, wherein the multiplied numerator and multiplication factor are amplified.